APPENDIX D

NFP RATINGS
and
ANALYSIS DETAILS

NFP Objectives:

Objective 1: Provide protection from flood damage
1.1 Safety - protection of public safety if conditions exceed design assumptions which includes flows, n-values, hydrograph shape, etc.
1.2 Economic Protection - protection from damage due to floodwaters, erosion or sediment for homes, schools, businesses, transportation systems and other infrastructure.
1.3 Durability - future effort required to maintain design level of protection
1.4 Resiliency - adaptability to future changes external to District activities (e.g. future development, vegetation growth).
1.5 Local Drainage - support of local storm drain systems
1.6 Time to Implementation - how quickly could flood protection elements become effective
Objective 2: Support ecological functions and processes
2.1 Local Habitat Goals - ability to meet habitat goals as defined from examining the watershed as a whole and accounting for opportunities and constraints speciufic to the project area.
2.2 Habitat Provided - quality of habitat provided by alternative
2.3 Sustainability of Habitat - intensity of future action required to maintain design habitat quality
2.4 Connectivity of Habitat - integration of habitat elements into surrounding habitat landscape and within project area.
Objective 3: Integrate Physical stream functions and processes
3.1 Floodplain - inclusion of appropriately sized floodplain
3.2 Active Channel - also known as bankfull channel, appropriateness of size and configuration of active channel
3.3 Stable Side Slopes - stability of channel side slopes using geotechnical biotecnical methods.
3.4 Transitions - stability of channel's integration with upstream and downstream reaches
Objective 4: Minimize maintenance requirements
4.1 Structural Features - maintenance associated with structures such as culverts, bridges or grade control.
4.2 Natural Processes - maintenance requirements associated with vegetation, erosion, and sediment. How well natural processes have been accounted for in the design so that activities such as vegetation growth, sediment removel or erosio protection are minimized.
4.3 Urban Flows - maintenance resulting from small stormevevts and outfall flows
4.4 Access - incorporation of adequate access for maintenance crews and equipment
Objective 5: Integrate Within Watershed
5.1 Meets Local Watershed Goals - ability to meet watershed goals as defined in a process that examines the watershed as a whole and accounts for opportunities and constraints specific to the project area.
Objective 6: Protect the quality and availability of water
6.1 Water Availability - impact on groundwater recharge
6.2 Instream Water Quality - water quality protection through vegetation and instream hydraulic complexity
6.3 Offstream Water Mgmt - ability to enhance water supply and quality and reduce peak flows through local retention of rainfall and pollution prevention programs.
6.4 Flow Regime - ability to maintain geomorphically and biologically appropriate range of flows - Quality and Timing.
Objective 7: Cooperate with other local agencies to achieve mutually - beneficial goals
7.1 Mutual Local Goals - ability to achieve project-specific goals and objectives developed jointly by the District and local agencies
7.2 Supports General Plan - ability to support goals and policies as stated in general plan of partner agencies
Objective 8: Community benefits beyond flood protection
8.1 Community Safety - overall safety for appropriate access and recreation
8.2 Recreation - quality of recreation experience provided by alternative
8.3 Aesthetics - quality of aesthetic form provided by alternative
8.4 Social and Cultural Benefits - opportunity through programs or physical features to promote community involvement.
8.5 Local Economic Effects - potential effect on property values and/or local business climate
8.6 Green Construction and Operation - reflection of the District's commitment to minimize its impact on the environment.
8.7 Open Space - incorporation of open space into alternative design
8.8 Community Support - alternative reflects community developed objectives and ideas
Objective 9: Minimize life-cycle costs
9.1 Capital Cost - -net present value of estimated cost
9.2 Maintenance Cost - net present value of all maintenance costs over the life of the project.

Non-NFP Objective:

Preliminary Impacts Assessment

Habitat - potential impacts to habitat

Traffic/Utilities - potential impacts to traffic and utilities

Aesthetics - potential impact to aesthetic values

Recreation - potential impact to existing recreational resources

Site 3
Saratoga-Sunnyvale Road

Natural Flood Protection (NFP) Criteria Ratings

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Notes:

(1) Each NFP criterion is rated for each alternative

(2) Criterion rating guidance is from August 2005 NFP manual

(3) The ratings are according to the following key:

0 = Unacceptable
1 = Poor
2 = Fair
3 = Adequate
4 = Very good
5 = Outstanding

Objective 1—Provide Protection from Flood Damage

Criterion 1: Safety – Protection of public safety if conditions exceed design assumptions

Rating Guidance:

Outstanding: Alternative continues to provide for public safety when flows exceed design flow

Adequate: Alternative improves safety compared to existing conditions when flows exceed design flow

Poor: Alternative provides safety only up to design flow

Unacceptable: Flood hazard is increased relative to existing conditions for flows exceeding design flow

Alternative	Rating	Score	Comments
Alt 3A: Underground bypass	Adequate	3	Construction of an underground bypass will eliminate the design flood hazard. The proposed bypass box will route excess flows around the problem area and reintroduce them to the channel further downstream and will carry half of the 1% design flow.
Alt 3B: Additional tunnel / new double tunnel	Adequate	3	Construction of an additional tunnel or a new double tunnel will eliminate the design flood hazard.
Alt 3C: Floodwall	Fair	2	Installation of floodwall upstream of Saratoga-Sunnyvale on the west bank will eliminate the design flood hazard. Top of flood conveyance channel/design water surface is at or below adjacent grade. Floodwall may have catastrophic failure.
Alt 3D: Swale detention	Adequate	3	Excavation of swale approximately 0-8 feet as a detention basin upstream of Saratoga-Sunnyvale Road on the east bank will eliminate the design flood hazard on the west bank at Blue Hills parking lot.
Alt 3E: Swale/tunnel mod.	Adequate	3	Construction of enlarged tunnel section and minor work at swale area will eliminate the design flood hazard.

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Objective 1—Flooding

Criterion 2: Economic Protection – Protection from damage due to floodwater, erosion or sediment for homes, schools, businesses, transportation systems and other infrastructure

Rating guidance:

Outstanding: exceeds federal and local standards for flood protection facilities.

Adequate: meets federal standards for flood protection facilities.

Poor: floods less than design flood may cause damage to instream features

Unacceptable: flows less than the design flood would likely cause substantial damage to instream features

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Adequate	3	Federal structural standards are met. Flows up to and including design flow would not enter buildings or disrupts transportation networks.
Alt 3B: Additional tunnel / new double tunnel	Adequate	3	Same as Alt 3A
Alt 3C: Floodwall	Adequate	3	Federal structural standards are met. Instream features of the project itself, including bed and banks may be subject to minimal, easily repairable damage (i.e. erosion) for design flow.
Alt 3D: Swale detention	Adequate	3	Same as Alt 3C
Alt 3E: Swale/tunnel mod.	Adequate	3	Same as Alt 3C

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Objective 1—Flooding

Criterion 3: Durability – Future District effort required to maintain design level of protection

Rating Guidelines:

Outstanding: level of protection virtually independent of future actions

Adequate: level of protection dependent on future actions which are realistic to apply

Poor: level of protection dependent on future actions which may be difficult to apply

Unacceptable: level of protection dependent on intense level of future action which may fail

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Adequate	3	Operation and maintenance activities are expected to be minimal.
Alt 3B: Additional tunnel / new double tunnel	Adequate	3	Same as Alt 3A
Alt 3C: Floodwall	Fair	2	There is a possibility of a catastrophic failure.
Alt 3D: Swale detention	Fair	2	Sediment deposition could occur near entry (upstream end) to swale; swale itself may also require maintenance with regards to sediment deposition and invasive vegetation and/or aquatic species (if present). However, both of these depend upon if and how the elevation of the swale inlet is changed.
Alt 3E: Swale/tunnel mod.	Adequate	3	Combination of Alt 3D and Alt 3A.

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Objective 1—Flooding

Criterion 4: Resiliency – Adaptability to future changes

Rating guidance:

Outstanding: Channel design would accommodate additional future features such as added capacity if needed.

Adequate: Channel design conveys runoff for the full buildout condition.

Poor: Channel designed to convey runoff from existing development.

Unacceptable: Channel design does not convey current design flows.

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Adequate	3	Channel design conveys runoff as generated by full build – out of existing general plan and there might be an ability to add capacity.
Alt 3B: Additional tunnel / new double tunnel	Adequate	3	Same as Alt 3A
Alt 3C: Floodwall	Adequate	3	There is an ability to add capacity, if needed, in the future without changing the basic design or land acquisition.
Alt 3D: Swale detention	Fair	2	After a big storm, it would take up to two days to drain the detention basin.
Alt 3E: Swale/tunnel mod.	Adequate	3	After a big storm, it would drain more quickly than Alt 3D, because Alt 3E would create a shallower basin.

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Objective 1—Flooding

Criterion 5: Local Drainage – Support of local storm drain systems

Rating guidance:

Outstanding: alternative design improves local drainage in storm sewers

Adequate: alternative accommodates drainage input and does not exacerbate local flooding

Poor: alternative accommodates local drainage but may increase local flooding somewhat

Unacceptable: alternative does not accommodate local drainage systems

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Adequate	3	This element accommodates most existing local drainage inputs without causing temporary street flooding.
Alt 3B: Additional tunnel / new double tunnel	Adequate	3	Same as Alt 3A
Alt 3C: Floodwall	Adequate	3	Floodwalls would not impede flows into the creek from the surrounding area.
Alt 3D: Swale detention	Very good	4	This element design improves local drainage (storm drain conveyance) where applicable
Alt 3E: Swale/tunnel mod.	Very good	4	This element accommodates most existing local drainage inputs without causing temporary street flooding and improves local drainage (storm drain conveyance) where applicable.

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Objective 1—Flooding

Criterion 6: Time to Implementation – How quickly could flood protection elements become effective

Rating guidance:

Outstanding: least amount of time to implementation compared to other alternatives

Adequate: average amount of time compared to other alternatives

Poor: longest amount of time compared to other alternatives

Unacceptable: Indefinite time

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Adequate	3	Time to implementation is average compared to other alternatives.
Alt 3B: Additional tunnel / new double tunnel	Fair	2	Time to implementation of additional tunnel is average compared to other alternatives. Time to implementation of the new double tunnel is longest compared to other alternatives.
Alt 3C: Floodwall	Very good	4	Time to implementation of effective flood protection is quicker than most other alternatives.
Alt 3D: Swale detention	Very good	4	Detention basin would provide immediate flood reduction.
Alt 3E: Swale/tunnel mod.	Adequate	3	Time to implementation is average compared to other alternatives.

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Objective 2—Support Ecologic Functions and Processes

Criterion 1: Meets Local Habitat Goals – Ability to meet habitat goals as defined from examining the watershed as a whole

In the absence of "Local Habitat Goals" local goals and ordinances regarding habitat were examined.

Rating guidance:

Outstanding: alternative meets or exceeds local habitat goals

Adequate: alternative meets some local habitat goals and is not in conflict with others

Poor: alternative is in conflict with a few local habitat goals

Unacceptable: alternative is in conflict with most local habitat goals

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Fair	2	This element partially meets local habitat goals.
Alt 3B: Additional tunnel / new double tunnel	Fair	2	This element partially meets local habitat goals. Would require removal of large protected trees in SJNB parking lot. However, this element could improve current conditions by reducing flood potential, erosion, and scouring of the stream channel.
Alt 3C: Floodwall	Poor	1	Floodwall could 1) increase velocity, 2) increase scour of channel bed, 3) decrease local floodplain connection and inundation of riparian areas, and 4) induce scour and erosion downstream of S-S Road if it raises the head upstream and increases pressure flow. Would result in removal and damage to protected trees, some are of heritage size. This element does not meet the local habitat goals.
Alt 3D: Swale detention	Fair	2	Same as Alt 3C for floodwalls at downstream end of the swale. detention basin could decrease local floodplain connection and inundation of riparian areas (i.e., downstream of swale inlet). Would also result in removal of wetlands and riparian vegetation. However, this element would re-create roughly the same amount of basin area (backwater habitat, pool refuge, etc.), as well as wetlands, that it would potentially eliminate, perhaps more. This element also provides an opportunity for riparian restoration. This element meets some local habitat goals and is not in conflict with others.
Alt 3E: Swale/tunnel mod.	Fair	2	This element partially meets habitat goals.

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Habitat Goals Checklist

Source	Goal	Status of Feasible Elements					
		Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E	No Project
City of Cupertino General Plan	*Protection of special areas of natural vegetation and wildlife habitation as integral parts of the sustainable environment*	X	X	X	*	*	X
City of Saratoga General Plan	*No habitat specific goals have been established*						
City of San Jose General Plan	*Species of concern*						
	Consideration should be given to setting aside conservation areas in the Bay and baylands, along riparian corridors, upland wetlands, and hillside areas to protect habitats of unique, threatened and endangered species of plants and animals, and to provide areas for educational and research purposes.	X	X	X	*	*	X
	Habitat areas that support Species of Concern should be retained to the greatest extent feasible.	X	X	X	*	X	X
Santa Clara County General Plan	*Water supply resources*						
	Restore wetlands, riparian areas, and other habitats that improve Bay water quality.	X	X	X	*	*	X
	Habitat and biodiversity						
	Improve current knowledge and awareness of habitats and natural areas.	X	X	X	X	X	X
	Protect the biological integrity of critical habitat areas.	X	X	X	*	*	X
	Encourage habitat restoration.	*	*	X	*	*	X
Watershed Management Initiative	Protect and/or restore streams, reservoirs, wetlands and the Bay for the benefit of fish, wildlife and human uses.	*	*	X	*	*	X
SCVWD Lower Peninsula Watershed Stewardship Plan	No independent goals, but requires consistency with District's Ends Policies (*see following).*	*	*	*	*	*	X
SCVWD Ends Policies	E-2.2.2—There is a balance between the contributions of watersheds and streams in providing for public health and safety and in providing protection of natural resource benefits.	X	X	X	*	*	X

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Key to Status:

*** = would exceed goal ** = would meet goal * = would partially meet goal

X = would not meet goal **NA** = goal not applicable (included to show context of other related goals

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Objective 2—Support Ecologic Functions and Processes

Criterion 2: Habitat Provided – Assesses quality of habitat provided by alternative

Rating guidance:

Outstanding: relatively undisturbed habitat, native plants, high potential to meet needs of fish and wildlife in all phases of lifecycle

Adequate: Adequately support the needs of fish and wildlife in all phases of lifecycle

Poor: Alternative focuses primarily on special needs of threatened or endangered species

Unacceptable: does not provide any habitat value

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Poor	1	This element consists of paved areas with no vegetation and will not provide any habitat value, but does not split existing habitat.
Alt 3B: Additional tunnel / new double tunnel	Poor	1	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	Installation of floodwall wouldn't disturb the channel invert area or any habitats inside the creek. Habitat above top of the bank would be disturbed by floodwall construction including removal of heritage trees. Operation of floodwall could 1) increase velocity, 2) increase scour of channel bed, 3) decrease local floodplain connection and inundation of riparian areas, and 4) induce scour downstream of S-S Road if it raises the head upstream and increases pressure flow. This element will not provide any habitat value.
Alt 3D: Swale detention	Fair	2	Same as Alt 3C for floodwalls at downstream end of the swale. Construction of this element would disturb channel invert and some habitat inside the creek. Operation of this element would likely create an expanded basin area with backwater habitats, pool refuge, etc. Over the long-term, development and maintenance of improved habitat, including wetlands, within the swale area is likely, though this would depend on the frequency with which it is designed to be inundated.
Alt 3E: Swale/tunnel mod.	Fair	2	Tunnel modification consists of paved areas with no vegetation and will not provide any habitat value. Retaining the swale with little change would not likely result in removal of existing wetlands and may improve and enhance wetlands habitat if project results in greater frequency and/or duration of inundation. There would be temporary loss of riparian vegetation during construction of the inlet and outlet structures.

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Objective 2—Support Ecologic Functions and Processes

Criterion 3: Sustainability of Habitat – Assesses intensity of future actions required to maintain design habitat quality

Rating guidance:

Outstanding: minimal channel maintenance, banks dynamically stable, vegetation to be self-sustaining

Adequate: periodic selective thinning of vegetation, banks dynamically stable, short-term establishment period needed

Poor: regular maintenance anticipated, channel banks may require stabilization over time, intervention needed to maintain vegetation over long term

Unacceptable: regular vegetation removal, unstable banks, constant irrigation needed

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Fair	2	Some maintenance anticipated
Alt 3B: Additional tunnel / new double tunnel	Fair	2	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	Some human intervention is necessary to address graffiti on the floodwalls or remove trash thrown over the floodwalls into the creek.
Alt 3D: Swale detention	Fair	2	Same as Alt 3C for a small floodwall at downstream of the swale, but channel capacity maintenance would likely be minimal, and the swale area should allow vegetation to develop, age and change naturally. However, both of these aspects are highly dependent upon the frequency with which the swale is designed to be inundated.
Alt 3E: Swale/tunnel mod.	Fair	2	Combination of Alt 3A and Alt 3D

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Objective 2—Support Ecologic Functions and Processes

Criterion 4: Connectivity of Habitat – Assesses integration of habitat elements into surrounding landscape

Rating guidance:

Outstanding: continuous riparian corridor appropriately integrated, creek and floodplain connected laterally

Adequate: contiguous wildlife-accessible corridor connected to habitat mosaic, floodplain not fully connected (and not fully unconnected) to riparian zone

Poor: non-contiguous riparian wildlife corridor, floodplain not connected to riparian zone

Unacceptable: not integrated into surrounding habitat

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Poor	1	Due to long stretch of the bypass this element does not provide contiguous riparian wildlife corridor and is not connected to surrounding habitat mosaic due to lack of surrounding habitat (this may be indicated by long stretches of underground tunnel or unvegetated corridor that are unattractive or impassable by local wildlife).
Alt 3B: Additional tunnel / new double tunnel	Poor	1	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	Floodwalls could impede some wildlife movement and would decrease the connectivity between the channel and the riparian zone.
Alt 3D: Swale detention	Adequate	3	Same as Alt 3C for floodwall at downstream end of the swale. This element also would maintain the existing condition with a deeper invert and would be revegetated and would not obstruct or delay wildlife movement.
Alt 3E: Swale/tunnel mod.	Adequate	3	The swale would maintain the existing condition with an overflow weir on the left bank and would be revegetated and would not obstruct or delay wildlife movement.

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Objective 3—Physical Stream Functions and Processes

Criterion 1: Floodplain – Inclusion of appropriately sized floodplain

Rating guidance:

Outstanding: active channel connected to floodplain at bankfull level, floodplain has adequate width.

Adequate: modified floodplain, active channel, limited r/w may require containment means, or bypass channel used

Poor: flow will not spread out laterally, multi-stage channel, but not at bankfull level

Unacceptable: single-phase channel

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Unacceptable	0	This element is a single-phase channel sized to convey the design flow; a floodplain is non-existent or completely disconnected from the channel. We did not consider the swale area as a potential flood plain.
Alt 3B: Additional tunnel / new double tunnel	Unacceptable	0	Same as Alt 3A
Alt 3C: Floodwall	Unacceptable	0	Same as Alt 3A
Alt 3D: Swale detention	Adequate	3	The swale area would serve as a modified floodplain/basin, one which would essentially store flood flows and (most of the time) not be directly connected to the channel along its length.
Alt 3E: Swale/tunnel mod.	Fair	2	Same as Alt 3D, though the tunnel component would be a single-phase channel.

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Objective 3—Physical Stream Functions and Processes

Criterion 2: Active Channel – Appropriateness of size and configuration of active channel

Rating guidance:

Outstanding: appropriate active channel shape, meander length, curve radius, amplitude, belt width, sediment carrying capability, mobile bed, pool riffle sequence, tidal processes. Control structures unnecessary.

Adequate: active channel with stable width and depth, rock or other hardscape used to prevent erosion, small drops, hardened one-side channels to maximize floodplain width

Poor: active channel incorporated, unknown if effective

Unacceptable: no active channel

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Unacceptable	0	Does not improve on current conditions
Alt 3B: Additional tunnel / new double tunnel	Unacceptable	0	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	The prevalence of lower bank (toe) erosion throughout the Project reach, and the fact that Calabazas Creek historically had a larger meander belt, suggests that the existing channel width and/or plain form is not dynamically stable. SCVWD studies suggest the existing channel invert is stable, yet this element could 1) increase velocity, 2) increase scour of channel bed, and 3) induce scour and erosion downstream of S-S Road if it raises the head upstream and increases pressure flow. Active channel design is only incorporated into this element by default in that the active channel pattern would be allowed to evolve relatively unhindered. However, due to lack of data, it is unknown whether this would eventually produce a stable channel form.
Alt 3D: Swale detention	Adequate	3	The prevalence of lower bank (toe) erosion throughout the Project reach, and the fact that Calabazas Creek historically had a larger meander belt, suggests that the existing channel width and/or plan form is not dynamically stable. Active channel design is only incorporated into this element by default in that the active channel pattern would be allowed to evolve relatively unhindered. However, the swale would provide downstream relief from erosion and protect channel bends during high flows.
Alt 3E: Swale/tunnel mod.	Fair	2	Combination of Alt 3D & Alt 3B

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Objective 3—Physical Stream Functions and Processes

Criterion 3: Stable Side Slopes – Stability of side slopes

Rating guidance:

Outstanding: all side slopes stable through use of proper slope ratios, materials, and vegetation

Adequate: side slopes protected through biotech means

Poor: side slopes protected using hardscape

Unacceptable: side slopes unstable and unprotected

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Poor	1	Side slopes are protected using hardscape.
Alt 3B: Additional tunnel / new double tunnel	Poor	1	Same as Alt 3A
Alt 3C: Floodwall	Unacceptable	0	Side slopes are not protected. Erosion is present and not addressed with this flood control element.
Alt 3D: Swale detention	Fair	2	Side slopes downstream of the swale inlet are indirectly protected by the diversion of high flows (i.e., high shear) into the swale.
Alt 3E: Swale/tunnel mod.	Fair	2	Tunnel side slopes are protected using hardscape; swale is same as Alt 3D.

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Objective 3—Physical Stream Functions and Processes

Criterion 4: Transitions – Stability of channel's integration with upstream and downstream reaches

Rating guidance:

Outstanding: invert integrated so that it transitions seamlessly with stable u/s and d/s reaches, no abrupt changes in grade or direction of flow

Adequate: requires small stabilizing grade controls (<18")

Poor: large (>18") hardscaped grade control needed

Unacceptable: unstable transitions between u/s and d/s reaches

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Adequate	3	Transition to upstream and/or downstream require a stabilizing grade control.
Alt 3B: Additional tunnel / new double tunnel	Adequate	3	Same as Alt 3A
Alt 3C: Floodwall	Very good	4	This element does not require any transitions.
Alt 3D: Swale detention	Adequate	3	This element requires transitions.
Alt 3E: Swale/tunnel mod.	Adequate	3	Same as Alt 3D.

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Objective 4—Minimize Maintenance Requirements

Criterion 1: Structural Features – Maintenance associated with structures

Rating guidance:

Outstanding: no structural features requiring maintenance

Adequate: need for features requiring maintenance reduced compared to existing

Poor: maintenance required roughly similar to existing

Unacceptable: more structural features than existing

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Adequate	3	Design of this structural feature accounts for and minimizes projected routine maintenance.
Alt 3B: Additional tunnel / new double tunnel	Adequate	3	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	Maintenance required for structural features is roughly equal or worse than those in the existing conditions. Flood walls will attract graffiti, which is a primary reason for this low rating.
Alt 3D: Swale detention	Poor	1	Maintenance is roughly equal or worse than those in the existing conditions with some structural features. Floodwalls will attract graffiti and structural features at upstream and downstream end of the swale might require maintenance.
Alt 3E: Swale/tunnel mod.	Adequate	3	Maintenance is equal to those in the existing conditions.

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Objective 4 – Minimize Maintenance Requirements

Criterion 2: Natural Processes – Maintenance associated with vegetation, erosion, and sediment

Rating guidance:

Outstanding: sediment and vegetation removal and bank repair not expected in 100 years

Adequate: sediment and vegetation removal and bank repair expected to be infrequent (about 10 years apart), multi-stage channel used

Poor: sediment and vegetation removal and bank repair expected on about three year cycle, no multi-stage channel

Unacceptable: yearly maintenance expected, single-phase channel

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Very Good	4	SCVWD sediment transport modeling looked at a 12-year simulation period; installation of double-tunnel (Alt 3B) was predicted to have little effect. This element incorporates a bypass to alleviate high flows. Bank erosion is not expected.
Alt 3B: Additional tunnel / new double tunnel	Very Good	4	Same as Alt 3A
Alt 3C: Floodwall	Fair	2	Some erosion is expected and emergency erosion repair might be necessary because of structures like floodwall which might be endangered.
Alt 3D: Swale detention	Fair	2	Same as Alt 3C for floodwalls at downstream end. Some erosion is expected, sediment deposition could occur near entry (upstream end) to swale; swale itself may also require maintenance with regards to sediment deposition and invasive vegetation and/or aquatic species (if present). However, both of these depend upon if and how the elevation of the swale inlet is changed.
Alt 3E: Swale/tunnel mod.	Adequate	3	Bank erosion is not expected in enlargement of the tunnel entrance, but some erosion is expected at swale area. Sediment deposition could occur near entry (upstream end) to swale; swale itself may also require maintenance with regards to sediment deposition and invasive vegetation and/or aquatic species (if present). However, both of these depend upon if and how the elevation of the swale inlet is changed.

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Objective 4—Minimize Maintenance Requirements

Criterion 3: Urban Flows – Maintenance resulting from small storms and outfall flows

Rating guidance:

Outstanding: maintenance requirements would be significantly reduced using outfall design, off-stream detention, grade control

Adequate: maintenance requirements would be somewhat reduced

Poor: maintenance requirements would be about the same

Unacceptable: much worse than current conditions

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Fair	2	This element addresses conveyance capacity improvements and not flow detention or prevention of incision and erosion. Maintenance requirements from urban flows would likely be reduced at the project site, but would be the same or worse downstream.
Alt 3B: Additional tunnel / new double tunnel	Fair	2	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	This element addresses conveyance capacity improvements and not flow detention or prevention of incision and erosion. Maintenance requirements from urban flows might be reduced at the project site, but would be the same or worse downstream..
Alt 3D: Swale detention	Very good	4	This element incorporates offstream detention which would reduce instream sedimentation/erosion impacts. For the swale, maintenance requirements from urban flows would be somewhat reduced or about the same.
Alt 3E: Swale/tunnel mod.	Adequate	3	Combination of Alt 3B and Alt 3D.

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Objective 4—Minimize Maintenance Requirements

Criterion 4: Access – Incorporation of adequate access for maintenance crews and equipment

Rating guidance:

Outstanding: multi-function access corridors optimized based on expected project needs

Adequate: complies with District policy 3-410

Poor: access corridors provided but does not comply with 3-410

Unacceptable: inadequate or no access provided

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Poor	1	Provides inadequate access for maintenance equipment
Alt 3B: Additional tunnel / new double tunnel	Poor	1	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	Provides no access for maintenance crews.
Alt 3D: Swale detention	Fair	2	Downstream end provides less access. Access would be the same as existing condition for other part of the swale.
Alt 3E: Swale/tunnel mod.	Fair	2	Tunnel modification provides inadequate access for maintenance equipment, but access would be the same for swale as existing condition.

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Objective 5—Integrate within the Watershed

Criterion 1: Meets Local Watershed Goals – Ability to meet watershed goals as defined in a process that examines the watershed as a whole

In the absence of "Local Watershed Goals" local goals and ordinances regarding watershed health were examined.

Rating guidance:

Outstanding: the alternative substantially advances watershed goals

Adequate: the alternative advances some goals and is not in conflict with any

Poor: the alternative is in conflict with a few major watershed goals

Unacceptable: the alternative is in conflict with several watershed goals

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Fair	2	This element advances the flood control watershed goal ,
Alt 3B: Additional tunnel / new double tunnel	Fair	2	Same as Alt 3A
Alt 3C: Floodwall	Fair	2	Same as Alt 3A
Alt 3D: Swale detention	Very Good	4	Provides a modified basin/floodplain
Alt 3E: Swale/tunnel mod.	Very Good	4	Same as Alt 3D

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Watershed Goals Checklist

Source	Goal	Status by Feasible Elements					
		Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E	No Project
City of Cupertino General Plan	*Policy 5-23: Conformance with Watershed-Based Planning and Zoning*	X	X	X	X	X	X
City of Saratoga General Plan	*No habitat specific goals have been established*						
City of San Jose General Plan	*No goals specific to watersheds are specified*						
Santa Clara County General Plan	*Water quality and watershed management*						
	Reduce non-point source pollution.	X	X	X	X	X	X
	Prepare and implement comprehensive watershed management plans.	X	X	X	X	X	X
Watershed Management Initiative	Balance the objectives of water supply management, habitat protection, flood management and land use to protect and enhance water quality.	X	X	X	*	*	X
SCVWD Lower Peninsula Watershed Stewardship Plan	*Incorporates District's Ends Policies (see following).*						
SCVWD Ends Policies	E-2.2.1—The cost of reducing the potential for flood damages is balanced with benefits (including possible environmental restoration and enhancement).	*	*	*	*	*	X
	E-2.2.2—There is a balance between the contributions of watersheds and streams in providing for public health and safety and in providing protection of natural resource benefits.	*	*	*	*	*	X
	E-3.1. Watersheds, streams, and the natural resources therein are protected and when appropriate enhanced or restored.	*	*	*	*	*	X

Key to Status:

*** = would exceed goal
** = would meet goal
* = would partially meet goal
X = would not meet goal

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Objective 6—Protect the Quality and Availability of Water

Criterion 1: Water Availability – Impact on groundwater recharge

Rating guidance:

Outstanding: alternative would result in a net increase in recharge potential and improve functionality and performance of diversions

Adequate: no net change in recharge potential, diversions not negatively impacted

Poor: would reduce the potential for recharge, diversions not negatively impacted

Unacceptable: substantially reduces opportunity for recharge or degrade performance of diversions

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Adequate	3	No net change in potential recharge for the project area.
Alt 3B: Additional tunnel / new double tunnel	Adequate	3	Same as Alt 3A
Alt 3C: Floodwall	Adequate	3	No net change in potential recharge for the project area since the channel invert width is the same.
Alt 3D: Swale detention	Adequate	3	This element would result in some decrease in recharge potential for the channel, but some increase in recharge potential for the basin since the swale area would be excavated.
Alt 3E: Swale/tunnel mod.	Adequate	3	No net change in potential recharge for the project area.

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Objective 6—Protect the Quality and Availability of Water

Criterion 2: Instream Water Quality – Water quality protection through vegetation and instream hydraulic complexity

Rating guidance:

Outstanding: alternative would improve water quality by creating a hydraulically complex channel and including native riparian vegetation in appropriate locations

Adequate: alternative would maintain current water quality conditions

Poor: alternative would reduce streamside vegetation and hydraulic complexity

Unacceptable: alternative would result in significant loss of vegetation, alternative would provide little or no hydraulic complexity

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Adequate	3	This element would not change the water quality.
Alt 3B: Additional tunnel / new double tunnel	Adequate	3	Same as Alt 3A
Alt 3C: Floodwall	Fair	2	Floodwall could 1) increase velocity, 2) increase scour of channel bed, 3) decrease local floodplain connection and inundation of riparian areas, and 4) induce scour and erosion downstream of S-S Road if it raises the head upstream and increases pressure flow.
Alt 3D: Swale detention	Adequate	3	Same as Alt 3C at downstream end. Side slopes downstream of the swale inlet are indirectly protected by the diversion of high flows (i.e., high shear) into the swale; this would likely reduce bank erosion and instream sediment and turbidity levels.
Alt 3E: Swale/tunnel mod.	Adequate	3	Tunnel same as Alt 3A; swale same as Alt 3D.

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Objective 6—Protect the Quality and Availability of Water

Criterion 3: Offstream Water Management – Ability to enhance water supply and quality and reduce peak flows through local retention of rainfall

Rating guidance:

Outstanding: alternative contains elements that significantly increase retention and use of rainwater, significantly reduces peak flows, includes educational programs

Adequate: moderately increases retention and use of rainwater, moderately reduces peak flows to the creeks, includes educational programs

Poor: alternative does not contain any such elements

Unacceptable: alternative would discourage local capture of rainfall/runoff

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Poor	1	Does not contain any such element.
Alt 3B: Additional tunnel / new double tunnel	Poor	1	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	Same as Alt 3A
Alt 3D: Swale detention	Poor	1	Same as Alt 3A
Alt 3E: Swale/tunnel mod.	Poor	1	Same as Alt 3A

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Objective 6—Protect the Quality and Availability of Water

Criterion 4: Flow Regime – Ability to maintain geomorphically and biologically appropriate range of flows

Rating guidance:

Outstanding: alternative maintains locally appropriate seasonal variation in flows that will support an appropriate physical channel configuration and habitat

Adequate: alternative includes modification to the locally appropriate flow regime with no significant impact on channel stability or habitat

Poor: alternative includes significant modifications to natural flow regime which is likely to have an impact on channel stability or habitat

Unacceptable: modifications to flow regime are likely to have a significant impact on channel stability or habitat

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Adequate	3	This element includes modifications to the locally appropriate flow regime (quantity and timing of flows).
Alt 3B: Additional tunnel / new double tunnel	Adequate	3	Same as Alt 3A
Alt 3C: Floodwall	Adequate	3	Same as Alt 3A
Alt 3D: Swale detention	Adequate	3	This element includes modifications to the existing flow regime (quantity and timing of flows). However, such modification likely reflects a more natural condition (i.e., the ability of high flows to leave the channel and spread into a wider, low velocity area) compared to the existing condition. No significant impact on the channel stability.
Alt 3E: Swale/tunnel mod.	Adequate	3	Tunnel entrance enlargement includes modification to the locally – appropriate flow regime (quantity and timing of flows), but swale modification has no significant impact on the channel stability.

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Objective 7—Cooperate with Other Local Agencies to Achieve Mutually Beneficial Goals

Criterion 1: Mutual Local Goals – ability to achieve project-specific goals and objectives developed jointly by the District and local agencies

Rating guidance:

Outstanding: all goals and objectives developed in a Memorandum of Consensus (MOC) are met

Adequate: some goals and objectives developed in the MOC of all agencies are met

Poor: MOC is developed but only District goals and objectives are met

Unacceptable: few objectives met, or no MOC developed

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Poor	1	A Memorandum of Consensus has not been developed yet.
Alt 3B: Additional tunnel / new double tunnel	Poor	1	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	Same as Alt 3A
Alt 3D: Swale detention	Poor	1	Same as Alt 3A
Alt 3E: Swale/tunnel mod.	Poor	1	Same as Alt 3A

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Objective 7—Supports General Plan – Ability to support goals and policies as stated in general plans of partner agencies

Rating guidance:

Outstanding: supports all pertinent general plan elements

Adequate: supports some general plan elements

Poor: does not support some general plan elements, is in conflict with few

Unacceptable: significant conflicts with major elements in general plans

Criterion 2: Supports General Plan

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Fair	2	A few of the goals and objectives developed for this element are consistent with the goals and objects expressed in the City of Saratoga's General Plan.
Alt 3B: Additional tunnel / new double tunnel	Fair	2	Same as Alt 3A
Alt 3C: Floodwall	Fair	2	Same as Alt 3A
Alt 3D: Swale detention	Adequate	3	Supports some general plan elements (more than Alt 3A, Alt 3B, and Alt 3C)
Alt 3E: Swale/tunnel mod.	Adequate	3	Same as Alt 3D

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General Plan Goals Checklist

Source	Goal	Status by Feasible Elements					
		Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E	No Project
City of Cupertino General Plan							
	Natural Water Courses: Retain and restore creek beds, riparian corridors, watercourses and associated vegetation in their natural state to protect wildlife habitat and recreation potential and assist groundwater percolation (Policy 5-27).	X	X	X	*	*	X
	Recreation and Wildlife Trails (Policy 5-14)	X	X	X	X	X	X
City of San Jose General Plan							
	Develop parks and public open space lands.	X	X	X	X	X	X
	Protect the community from flood damage	**	**	**	**	**	X
City of Saratoga General Plan							
	To provide and maintain open space resources of local and regional significance accessible to the public	X	X	X	*	*	X
	To provide and maintain parks and a variety of passive and active recreational sites which are located, designed, and improved to serve the needs of the residents, the community, and the neighborhoods of Saratoga	X	X	X	*	*	X
Santa Clara County General Plan	Develop parks and public open space lands.	X	X	X	X	X	X
	Minimize the resident population within high hazard areas.	*	*	*	*	*	X
	Reduce the magnitude of the hazard, if feasible.	*	*	*	*	*	X

Key to Status:

*** = would exceed goal
** = would meet goal
* = would partially meet goal
X = would not meet goal
NA = goal not applicable (included to show context of other related goals)

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Objective 8—Community Benefits beyond Flood Protection

Criterion 1: Community Safety – Overall safety for appropriate access and recreation

Rating guidance:

Outstanding: all safety issues identified by public safety officials during their review is addressed

Adequate: most safety issues identified addressed, explanation provided for features deemed inappropriate or infeasible

Poor: few if any recommendations incorporated into alternative

Unacceptable: alternative was not reviewed by public safety officials

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Fair	2	A more complete review by public safety officials should be done before implementing this alternative
Alt 3B: Additional tunnel / new double tunnel	Fair	2	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	Safety concern associated with floodwalls. A more complete review by public safety officials should be done before implementing this alternative
Alt 3D: Swale detention	Fair	2	Same as Alt 3A
Alt 3E: Swale/tunnel mod.	Fair	2	Same as Alt 3A

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Objective 8—Community Benefits beyond Flood Protection

Criterion 2: Recreation – Quality of recreation experience provided by alternative

Rating guidance:

Outstanding: project would provide unique quality recreational opportunities or a variety of opportunities with good public access and amenities

Adequate: some recreational opportunities incorporated into alternative, access may be limited

Poor: few or no recreational facilities incorporated into alternative

Unacceptable: existing recreational facilities are removed

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Poor	1	No recreational facilities are provided by this element
Alt 3B: Additional tunnel / new double tunnel	Poor	1	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	Same as Alt 3A
Alt 3D: Swale detention	Poor	1	Same as Alt 3A
Alt 3E: Swale/tunnel mod.	Poor	1	Same as Alt 3A

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Objective 8—Community Benefits beyond Flood Protection

Criterion 3: Aesthetics – Assesses quality of aesthetic form provided by alternative

Rating guidance:

Outstanding: this criteria is a qualitative assessment some features to consider include harmonizing with landscape, emulating the natural environment, unexpected large/small features, concrete textured or formed to mimic natural features, park-like setting, art use, amenities such as benches, is clever.

Unacceptable: hardscape significantly greater than greenscape, visual monotony, heavy use of plain concrete

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Fair	2	The underground bypass would not significantly change existing aesthetics.
Alt 3B: Additional tunnel / new double tunnel	Fair	2	An additional tunnel has no long-term impact, but construction of a new double tunnel would require the removal of some vegetation including big trees on the SJNB parking lot.
Alt 3C: Floodwall	Poor	1	Significant visual impact will occur with the installation of approximately 6-feet high floodwall.
Alt 3D: Swale detention	Fair	2	Same as Alt 3C at downstream end. Potential adjacent improved aesthetics
Alt 3E: Swale/tunnel mod.	Adequate	3	Enlargement of tunnel might require the removal of some vegetation at tunnel entrance, but the swale would result in potential adjacent improved aesthetics

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Objective 8—Community Benefits beyond Flood Protection

Criterion 4: Social and Cultural Benefits – Opportunity to promote community involvement

Rating guidance:

Outstanding: includes appropriate infrastructure to support full range of social and cultural benefits

Adequate: includes appropriate infrastructure to support some social and cultural benefits

Poor: does not include appropriate infrastructure

Unacceptable: eliminates existing features or includes inappropriate features

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Fair	2	Social and cultural benefits such as education/interpretation and community development have not yet been considered.
Alt 3B: Additional tunnel / new double tunnel	Fair	2	Same as Alt 3A
Alt 3C: Floodwall	Fair	2	Same as Alt 3A
Alt 3D: Swale detention	Adequate	3	This element may benefit the adjacent property.
Alt 3E: Swale/tunnel mod.	Adequate	3	Same as Alt 3D

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Objective 8—Community Benefits beyond Flood Protection

Criterion 5: Local Economic Effects – Potential effect on property values and/or local business climate

Rating guidance:

Outstanding: probably increase in value of adjacent properties, commercial benefits to local businesses such as increased foot traffic, alternative increases development possibilities

Adequate: no measurable change to property values or local businesses

Poor: no change to property values, businesses negatively impacted

Unacceptable: decrease in property values and commercial access

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Fair	2	Economic benefits have not been thoroughly analyzed
Alt 3B: Additional tunnel / new double tunnel	Fair	2	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	Economic benefits have not been thoroughly analyzed Floodwall may cause a change in adjacent property value.
Alt 3D: Swale detention	Fair	2	Same as Alt 3A
Alt 3E: Swale/tunnel mod.	Fair	2	Same as Alt 3A

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Objective 8—Community Benefits beyond Flood Protection

Criterion 6: Open Space – Incorporation of open space into alternative design

Rating guidance:

Outstanding: ensures long-term protection of existing open space, creates new open space

Adequate: reserves existing open space in project area

Poor: existing open space would be degraded

Unacceptable: significant loss of existing open space

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Adequate	3	This element has no negative or positive impacts to existing open space within project area.
Alt 3B: Additional tunnel / new double tunnel	Adequate	3	Same as Alt 3A
Alt 3C: Floodwall	Fair	2	Floodwall adjacent to existing trail may degrade some open space.
Alt 3D: Swale detention	Adequate	3	Same as Alt 3A
Alt 3E: Swale/tunnel mod.	Adequate	3	Same as Alt 3A

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Objective 8—Community Benefits beyond Flood Protection

Criterion 7: Community Support – Alternative reflects community developed objectives and ideas

Rating guidance:

Outstanding: relative to other alternatives, community indicates preference for this alt

Adequate: community indicates acceptance of the alternative

Poor: community lacks support for the alternative

Unacceptable: community finds alternative unacceptable

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Fair	2	The District has not yet collaborated with the public in this decision making process.
Alt 3B: Additional tunnel / new double tunnel	Fair	2	Same as Alt 3A.
Alt 3C: Floodwall	Poor	1	The District has not yet collaborated with the public in this decision making process. Floodwalls are not usually welcome additions and community clearly indicates a lack of acceptance to this element.
Alt 3D: Swale detention	Fair	2	Same as Alt 3A.
Alt 3E: Swale/tunnel mod.	Fair	2	Same as Alt 3A.

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Objective 9—Minimize Life-Cycle Costs

Criterion 1: Net Present Value of Estimated Cost

Rating guidance:

Outstanding: Lowest capital cost

Very good:

Adequate:

Fair:

Poor:

Unacceptable: Highest capital cost

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Poor	1	$4.6 million (SCVWD, 2007)
Alt 3B: Additional tunnel / new double tunnel	Poor	1	$4.0 million/ $5.2 million (SCVWD, 2007)
Alt 3C: Floodwall	Very good	4	$0.4 million (SCVWD, 2007)
Alt 3D: Swale detention	Adequate	3	$0.8 million (SCVWD, 2007)
Alt 3E: Swale/tunnel mod.	Adequate	3	$1.1 million (SCVWD, 2007)

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Objective 9—Minimize Life-Cycle Costs

Criterion 2: Maintenance cost

Rating guidance:

Outstanding: Lowest maintenance cost

Very good:

Adequate:

Fair:

Poor:

Unacceptable: Highest maintenance cost

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Poor	1	Not determined
Alt 3B: Additional tunnel / new double tunnel	Poor	1	Not determined
Alt 3C: Floodwall	Very good	4	$500 (SCVWD, 2007)
Alt 3D: Swale detention	Adequate	3	$1500 (SCVWD, 2007)
Alt 3E: Swale/tunnel mod.	Adequate	3	$1500 (SCVWD, 2007)

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Objective 9—Minimize Life-Cycle Costs

Criterion 3: Grant or Cost-sharing opportunities

Rating guidance:

Outstanding: Greatest Opportunity

Very good:

Adequate:

Fair:

Poor:

Unacceptable: Smallest Opportunity

Alternative	Rating	# Score	Comments
Alt 3A: Underground bypass	Poor	1	These opportunities have not been identified
Alt 3B: Additional tunnel / new double tunnel	Poor	1	Same as Alt 3A
Alt 3C: Floodwall	Poor	1	Same as Alt 3A
Alt 3D: Swale detention	Poor	1	Same as Alt 3A
Alt 3E: Swale/tunnel mod.	Poor	1	Same as Alt 3A

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NFP Objective Ratings Calculation Table

SITE #3 (Prospect Rd to Saratoga-Sunnyvale Rd)

Alt 3A = Underground bypass
Alt 3B = Additional cell/double tunnel
Alt 3C = Floodwall
Alt 3D = Swale detention basin
Alt 3E = Swale & tunnel modification

	Factor	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E
Objective 1: Flood Protection						
1.1 Safety	**0.30**	3.00	3.00	2.00	3.00	3.00
1.2 Economic Protection	**0.30**	3.00	3.00	3.00	3.00	3.00
1.3 Durability	**0.10**	3.00	3.00	2.00	2.00	3.00
1.4 Resiliency	**0.10**	3.00	3.00	3.00	2.00	3.00
1.5 Local Drainage	**0.10**	3.00	3.00	3.00	4.00	4.00
1.6 Time to Implementation	**0.10**	3.00	2.00	4.00	4.00	3.00
Objective Score:		**3.00**	**2.90**	**2.70**	**3.00**	**3.10**
Objective 2: Ecological Functions						
2.1 Local Habitat Goals	**0.25**	2.00	2.00	1.00	2.00	2.00
2.2 Habitat Provided	**0.25**	1.00	1.00	1.00	2.00	2.00
2.3 Sustainability of Habitat	**0.25**	2.00	2.00	1.00	2.00	2.00
2.4 Connectivity of Habitat	**0.25**	1.00	1.00	1.00	3.00	3.00
Objective Score:		**1.50**	**1.50**	**1.00**	**2.25**	**2.25**
Objective 3: Physical Stream Functions						
3.1 Floodplain	**0.35**	0.00	0.00	0.00	3.00	2.00
3.2 Active Channel	**0.30**	0.00	0.00	1.00	3.00	2.00
3.3 Stable Side Slopes	**0.20**	1.00	1.00	0.00	2.00	2.00
3.4 Transitions	**0.15**	3.00	3.00	4.00	3.00	3.00
Objective Score:		**0.65**	**0.65**	**0.90**	**2.80**	**2.15**
Objective 4: Maintenance						
4.1 Structural Features	**0.25**	3.00	3.00	1.00	1.00	3.00
4.2 Natural Processes	**0.25**	4.00	4.00	2.00	2.00	3.00
4.3 Urban Flows	**0.25**	2.00	2.00	1.00	4.00	3.00
4.4 Access	**0.25**	1.00	1.00	1.00	2.00	2.00
Objective Score:		**2.50**	**2.50**	**1.25**	**2.25**	**2.75**
Objective 5: Integrate Within Watershed						
5.1 Meets Local Watershed Goals	**1.00**	2.00	2.00	2.00	3.00	4.00
Objective Score:		**2.00**	**2.00**	**2.00**	**3.00**	**4.00**
Objective 6: Water Quality						
6.1 Water Availability (GW Recharge)	**0.30**	3.00	3.00	3.00	3.00	3.00
6.2 Instream WQ (Channel, Veg)	**0.40**	3.00	3.00	2.00	3.00	3.00
6.3 Offstream Water Mgmt (Runoff, Pollution)	**0.20**	1.00	1.00	1.00	1.00	1.00
6.4 Flow Regime	**0.10**	3.00	3.00	3.00	3.00	3.00
Objective Score:		**2.60**	**2.60**	**2.20**	**2.60**	**2.60**
Objective 7: Local Agency Cooperation						
7.1 Mutual Local Goals	**0.50**	1.00	1.00	1.00	1.00	1.00
7.2 Supports General Plan	**0.50**	2.00	2.00	2.00	3.00	3.00
Objective Score:		**1.50**	**1.50**	**1.50**	**2.00**	**2.00**
Objective 8: Community Benefits						
8.1 Community Safety (for Access and Rec)	**0.15**	2.00	2.00	1.00	2.00	2.00
8.2 Recreation	**0.20**	1.00	1.00	1.00	1.00	1.00
8.3 Aesthetics	**0.15**	2.00	2.00	1.00	2.00	3.00
8.4 Social and Cultural Benefits	**0.05**	2.00	2.00	2.00	3.00	3.00
8.5 Local Economic Effects	**0.15**	2.00	2.00	1.00	2.00	2.00
8.6 Open Space	**0.15**	3.00	3.00	2.00	3.00	3.00
8.7 Community Support	**0.15**	2.00	2.00	1.00	2.00	2.00
Objective Score:		**1.95**	**1.95**	**1.20**	**2.00**	**2.15**
Objective 9: Cost						
9.1 Total Lifetime Cost	**1.00**	1.00	1.00	4.00	3.00	3.00
Objective Score:		**1.00**	**1.00**	**4.00**	**3.00**	**3.00**

Preliminary Impacts Assessment
Habitat
Traffic/Utilities
Aesthetics
Recreation

NFP Objective Ratings Calculation Table

Objective Score:

Ratings Key: 5.0 = Outstanding; 4.0 = Very good; 3.0 = Adequate; 2.0 = Fair; 1.0 = Poor; 0.0 = Unacceptable
Objective Score Key:
4.5 to 5 = Outstanding; 3.5 to 4.49 = Very good; 2.5 to 3.49 = Adequate; 1.5 to 2.49 = Fair; 0.5 to 1.49 = Poor; 0 to 0.49 = Unacceptable

NFP Objective Ratings Calculation Table

NFP Objective Ratings Calculation Table

Feasible Alternatives NFP Objective Ratings

SITE #3 (Prospect Rd to Saratoga-Sunnyvale Rd)

District Ends Policy 2.2.1 (Natural Flood Protection):	Objective Weight Rank:	Underground RCB* bypass Alt 3A	Additional RCB* / double RCB* Alt 3B	Floodwall Alt 3C	Swale detention basi Alt 3D	Swale detention and tunnel modification Alt 3E
1. Provide protection from flood damage	M					
2. Support ecological functions and processes	H					
3. Integrate physical stream functions and processes	H					
4. Minimize maintenance requirements	H					
5. Integrate within the context of the watershed	L					
6. Protect the quality and availability of water	M					
7. Cooperate with other local agencies to achieve mutual goals	M					
8. Maximize community benefits beyond flood protection	L					
9. Minimize life-cycle costs	M					

Ratings Key:

Outstanding:	●	Fair:	
Very Good:		Poor:	
Adequate:		Unacceptable:	X

* RCB = Reinforced Concrete Box

Site 4
Union Pacific Rail Road (UPRR)

Natural Flood Protection (NFP) Criteria Ratings

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Notes:

(1) Each NFP criterion is rated for each alternative

(2) Criterion rating guidance is from August 2005 NFP manual

(3) The ratings are according to the following key:

0 = Unacceptable
1 = Poor
2 = Fair
3 = Adequate
4 = Very good
5 = Outstanding

Objective 1—Provide Protection from Flood Damage

Criterion 1: Safety – Protection of public safety if conditions exceed design assumptions

Rating Guidance:

Outstanding: Alternative continues to provide for public safety when flows exceed design flow

Adequate: Alternative improves safety compared to existing conditions when flows exceed design flow

Poor: Alternative provides safety only up to design flow

Unacceptable: Flood hazard is increased relative to existing conditions for flows exceeding design flow

Alternative	Rating	Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	Construction of an underground bypass consisting of a 6-foot diameter concrete circular culvert under residential backyards and the railroad tracks would eliminate the design flood hazard. The proposed bypass will route excess flows around the problem area and reintroduce them to the channel further downstream.
Alt 4B: Double RCB	Adequate	3	Construction of a new double box culvert will eliminate the design flood hazard.
Alt 4C: Floodwall	Adequate	3	Installation of floodwall upstream of UPRR on both banks will eliminate the design flood hazard. Top of flood conveyance channel/design water surface is at or below adjacent grade.

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Objective 1—Flooding

Criterion 2: Economic Protection – Protection from damage due to floodwater, erosion or sediment for homes, schools, businesses, transportation systems and other infrastructure

Rating guidance:

Outstanding: exceeds federal and local standards for flood protection facilities.

Adequate: meets federal standards for flood protection facilities.

Poor: floods less than design flood may cause damage to instream features

Unacceptable: flows less than the design flood would likely cause substantial damage to instream features

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	Federal structural standards are met. Flows up to and including design flow would not enter buildings or disrupts transportation networks.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A.
Alt 4C: Floodwall	Adequate	3	Federal structural standards are met. Instream features of the project itself, including bed and banks may be subject to minimal, easily repairable damage (i.e. erosion) for design flow.

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Objective 1—Flooding

Criterion 3: Durability – Future District effort required to maintain design level of protection

Rating Guidelines:

Outstanding: level of protection virtually independent of future actions

Adequate: level of protection dependent on future actions which are realistic to apply

Poor: level of protection dependent on future actions which may be difficult to apply

Unacceptable: level of protection dependent on intense level of future action which may fail

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	Operation and maintenance of the UPRR bypass would be minimal.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Fair	2	There is a possibility of a catastrophic failure

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Objective 1—Flooding

Criterion 4: Resiliency – Adaptability to future changes

Rating guidance:

Outstanding: Channel design would accommodate additional future features such as added capacity if needed.

Adequate: Channel design conveys runoff for the full buildout condition.

Poor: Channel designed to convey runoff from existing development.

Unacceptable: Channel design does not convey current design flows.

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	Channel design conveys runoff as generated by full build – out of existing general plan.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Adequate	3	There is an ability to add capacity, if needed, in the future without changing the basic design

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Objective 1—Flooding

Criterion 5: Local Drainage – Support of local storm drain systems

Rating guidance:

Outstanding: alternative design improves local drainage in storm sewers

Adequate: alternative accommodates drainage input and does not exacerbate local flooding

Poor: alternative accommodates local drainage but may increase local flooding somewhat

Unacceptable: alternative does not accommodate local drainage systems

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	This element accommodates most existing local drainage inputs without causing temporary flooding.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Adequate	3	Floodwalls would not impede flows into the creek from the surrounding area.

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Objective 1—Flooding

Criterion 6: Time to Implementation – How quickly could flood protection elements become effective

Rating guidance:

Outstanding: least amount of time to implementation compared to other alternatives

Adequate: average amount of time compared to other alternatives

Poor: longest amount of time compared to other alternatives

Unacceptable: Indefinite time

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	Time to implementation is average compared to another alternative
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Very Good	4	Least amount of time to implementation.

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Objective 2—Support Ecologic Functions and Processes

Criterion 1: Meets Local Habitat Goals – Ability to meet habitat goals as defined from examining the watershed as a whole

In the absence of "Local Habitat Goals" local goals and ordinances regarding habitat were examined.

Rating guidance:

Outstanding: alternative meets or exceeds local habitat goals

Adequate: alternative meets some local habitat goals and is not in conflict with others

Poor: alternative is in conflict with a few local habitat goals

Unacceptable: alternative is in conflict with most local habitat goals

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	This element would result in temporary and/or permanent removal and/or damage to protected trees. This element could also result in temporary impacts to existing instream wetlands.
Alt 4B: Double RCB	Fair	2	This element would result in temporary impacts to existing wetlands. However, wetlands would likely re-establish naturally after disturbance. The area of disturbance is much less than in Alt 4A.
Alt 4C: Floodwall	Unacceptable	0	Floodwall could 1) increase velocity, 2) increase scour of channel bed, 3) decrease local floodplain connection and inundation of riparian areas, and 4) induce scour and erosion downstream of S-S Road if it raises the head upstream and increases pressure flow. Floodwall would result in removal and/or damage to protected trees.

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Habitat Goals Checklist

Source	Goal	Status of Feasible Elements			
		Alt 4A	Alt 4B	Alt 4C	
City of Cupertino General Plan	*Protection of special areas of natural vegetation and wildlife habitation as integral parts of the sustainable environment*	X	X	X	
City of Saratoga General Plan	*No habitat specific goals have been established*				
City of San Jose General Plan	*Species of concern*				
	Consideration should be given to setting aside conservation areas in the Bay and baylands, along riparian corridors, upland wetlands, and hillside areas to protect habitats of unique, threatened and endangered species of plants and animals, and to provide areas for educational and research purposes.	X	X	X	
	Habitat areas that support Species of Concern should be retained to the greatest extent feasible.	X	X	X	
Santa Clara County General Plan	*Water supply resources*				
	Restore wetlands, riparian areas, and other habitats that improve Bay water quality.	X	X	X	
	Habitat and biodiversity				
	Improve current knowledge and awareness of habitats and natural areas.	X	X	X	
	Protect the biological integrity of critical habitat areas.	X	*	X	
	Encourage habitat restoration.	X	X	X	
Watershed Management Initiative	Protect and/or restore streams, reservoirs, wetlands and the Bay for the benefit of fish, wildlife and human uses.	X	X	X	
SCVWD Lower Peninsula Watershed Stewardship Plan	No independent goals, but requires consistency with District's Ends Policies.	*	*	*	
SCVWD Ends Policies	E-2.2.2—There is a balance between the contributions of watersheds and streams in providing for public health and safety and in providing protection of natural resource benefits.	*	*	*	

Key to Status:

*** = would exceed goal ** = would meet goal * = would partially meet goal

X = would not meet goal **NA** = goal not applicable (included to show context of other related goals)

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Objective 2—Support Ecologic Functions and Processes

Criterion 2: Habitat Provided – Assesses quality of habitat provided by alternative

Rating guidance:

Outstanding: relatively undisturbed habitat, native plants, high potential to meet needs of fish and wildlife in all phases of lifecycle

Adequate: Adequately support the needs of fish and wildlife in all phases of lifecycle

Poor: Alternative focuses primarily on special needs of threatened or endangered species

Unacceptable: does not provide any habitat value

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	This element consists of paved areas with no vegetation and will not provide any habitat value, but does not split existing habitat
Alt 4B: Double RCB	Poor	1	Same as Alt 4A
Alt 4C: Floodwall	Unacceptable	0	Temporary loss of habitat and vegetation due to excavation. Operation of floodwall could 1) increase velocity, 2) increase scour of channel bed, 3) decrease local floodplain connection and inundation of riparian areas, and 4) induce scour downstream of UPRR Road if it raises the head upstream and increases pressure flow. This element will not provide any habitat value.

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Objective 2—Support Ecologic Functions and Processes

Criterion 3: Sustainability of Habitat – Assesses intensity of future actions required to maintain design habitat quality

Rating guidance:

Outstanding: minimal channel maintenance, banks dynamically stable, vegetation to be self-sustaining

Adequate: periodic selective thinning of vegetation, banks dynamically stable, short-term establishment period needed

Poor: regular maintenance anticipated, channel banks may require stabilization over time, intervention needed to maintain vegetation over long term

Unacceptable: regular vegetation removal, unstable banks, constant irrigation needed

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	Regular maintenance anticipated. This element will not provide any habitat value or quality
Alt 4B: Double RCB	Adequate	3	Periodic maintenance anticipated.
Alt 4C: Floodwall	Poor	1	Some human intervention is necessary to address graffiti on the floodwalls or remove trash thrown over the floodwalls into the creek. This element will not provide any habitat value or quality.

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Objective 2—Support Ecologic Functions and Processes

Criterion 4: Connectivity of Habitat – Assesses integration of habitat elements into surrounding landscape

Rating guidance:

Outstanding: continuous riparian corridor appropriately integrated, creek and floodplain connected laterally

Adequate: contiguous wildlife-accessible corridor connected to habitat mosaic, floodplain not fully connected (and not fully unconnected) to riparian zone

Poor: non-contiguous riparian wildlife corridor, floodplain not connected to riparian zone

Unacceptable: not integrated into surrounding habitat

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	Underground RCP bypass could impede some wildlife movement
Alt 4B: Double RCB	Adequate	3	Double RCB would not impede wildlife movement.
Alt 4C: Floodwall	Poor	1	Floodwall could impede some wildlife movement.

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Objective 3—Physical Stream Functions and Processes

Criterion 1: Floodplain – Inclusion of appropriately sized floodplain

Rating guidance:

Outstanding: active channel connected to floodplain at bankfull level, floodplain has adequate width.

Adequate: modified floodplain, active channel, limited r/w may require containment means, or bypass channel used

Poor: flow will not spread out laterally, multi-stage channel, but not at bankfull level

Unacceptable: single-phase channel

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Unacceptable	0	This element is a single-phase channel sized to convey the design flow; a floodplain is non-existent or completely disconnected from the channel.
Alt 4B: Double RCB	Unacceptable	0	Same as Alt 4A
Alt 4C: Floodwall	Unacceptable	0	Same as Alt 4A

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Objective 3—Physical Stream Functions and Processes

Criterion 2: Active Channel – Appropriateness of size and configuration of active channel

Rating guidance:

Outstanding: appropriate active channel shape, meander length, curve radius, amplitude, belt width, sediment carrying capability, mobile bed, pool riffle sequence, tidal processes. Control structures unnecessary.

Adequate: active channel with stable width and depth, rock or other hardscape used to prevent erosion, small drops, hardened one-side channels to maximize floodplain width

Poor: active channel incorporated, unknown if effective

Unacceptable: no active channel

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Unacceptable	0	Does not improve on current conditions
Alt 4B: Double RCB	Fair	2	Active channel incorporated
Alt 4C: Floodwall	Poor	1	The prevalence of lower bank (toe) erosion throughout the Project reach, and the fact that Calabazas Creek historically had a larger meander belt, suggests that the existing channel width and/or plan form is not dynamically stable. SCVWD studies suggest the existing channel invert is stable, yet this element could 1) increase velocity, 2) increase scour of channel bed, and 3) induce scour and erosion downstream of UPRR if it raises the head upstream and increases pressure flow. Active channel design is only incorporated into this element by default in that the active channel pattern would be allowed to evolve relatively unhindered. However, due to lack of data, it is unknown whether this would eventually produce a stable channel form.

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Objective 3—Physical Stream Functions and Processes

Criterion 3: Stable Side Slopes – Stability of side slopes

Rating guidance:

Outstanding: all side slopes stable through use of proper slope ratios, materials, and vegetation

Adequate: side slopes protected through biotech means

Poor: side slopes protected using hardscape

Unacceptable: side slopes unstable and unprotected

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	Side slopes are protected using hardscape.
Alt 4B: Double RCB	Poor	1	Same as Alt 4A
Alt 4C: Floodwall	Unacceptable	0	Side slopes are not protected. Erosion is present and not addressed with this flood control element.

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Objective 3—Physical Stream Functions and Processes

Criterion 4: Transitions – Stability of channel's integration with upstream and downstream reaches

Rating guidance:

Outstanding: invert integrated so that it transitions seamlessly with stable u/s and d/s reaches, no abrupt changes in grade or direction of flow

Adequate: requires small stabilizing grade controls (<18")

Poor: large (>18") hardscaped grade control needed

Unacceptable: unstable transitions between u/s and d/s reaches

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	Transition to upstream and/or downstream require a stabilizing grade control.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Very good	4	This alternative does not require any transitions along the channel

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Objective 4—Minimize Maintenance Requirements

Criterion 1: Structural Features – Maintenance associated with structures

Rating guidance:

Outstanding: no structural features requiring maintenance

Adequate: need for features requiring maintenance reduced compared to existing

Poor: maintenance required roughly similar to existing

Unacceptable: more structural features than existing

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	Design of this structural feature accounts for and minimizes projected routine maintenance.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A.
Alt 4C: Floodwall	Poor	1	Maintenance required for structural features is roughly equal or worse than those in the existing conditions. Flood walls will attract graffiti, which is a primary reason for this low rating.

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Objective 4 – Minimize Maintenance Requirements

Criterion 2: Natural Processes – Maintenance associated with vegetation, erosion, and sediment

Rating guidance:

Outstanding: sediment and vegetation removal and bank repair not expected in 100 yeas

Adequate: sediment and vegetation removal and bank repair expected to be infrequent (about 10 years apart), multi-stage channel used

Poor: sediment and vegetation removal and bank repair expected on about three year cycle, no multi-stage channel

Unacceptable: yearly maintenance expected, single-phase channel

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Fair	2	This element incorporates a bypass to alleviate high flows. Bank erosion is not expected. Length of RCP may result in more maintenance than Alt 4B.
Alt 4B: Double RCB	Adequate	3	This element incorporates a bypass to alleviate high flows. Bank erosion is not expected
Alt 4C: Floodwall	Fair	2	Some erosion is expected and emergency erosion repair might be necessary because of structures like floodwall which might be endangered.

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Objective 4—Minimize Maintenance Requirements

Criterion 3: Urban Flows – Maintenance resulting from small storms and outfall flows

Rating guidance:

Outstanding: maintenance requirements would be significantly reduced using outfall design, off-stream detention, grade control

Adequate: maintenance requirements would be somewhat reduced

Poor: maintenance requirements would be about the same

Unacceptable: much worse than current conditions

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Fair	2	This element addresses conveyance capacity improvements and not flow detention or prevention of incision and erosion. Maintenance requirements from urban flows would likely be reduced at the project site, but would be the same or worse downstream.
Alt 4B: Double RCB	Fair	2	Same as Alt 4A
Alt 4C: Floodwall	Fair	2	Same as Alt 4A

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Objective 4—Minimize Maintenance Requirements

Criterion 4: Access – Incorporation of adequate access for maintenance crews and equipment

Rating guidance:

Outstanding: multi-function access corridors optimized based on expected project needs

Adequate: complies with District policy 3-410

Poor: access corridors provided but does not comply with 3-410

Unacceptable: inadequate or no access provided

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	Provides inadequate access for maintenance crew and their equipment.
Alt 4B: Double RCB	Poor	1	Same as Alt 4A
Alt 4C: Floodwall	Poor	1	Same as Alt 4A

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Objective 5—Integrate within the Watershed

Criterion 1: Meets Local Watershed Goals – Ability to meet watershed goals as defined in a process that examines the watershed as a whole

In the absence of "Local Watershed Goals" local goals and ordinances regarding watershed health were examined.

Rating guidance:

Outstanding: the alternative substantially advances watershed goals

Adequate: the alternative advances some goals and is not in conflict with any

Poor: the alternative is in conflict with a few major watershed goals

Unacceptable: the alternative is in conflict with several watershed goals

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	This alternative may be in conflict with a number of watershed goals
Alt 4B: Double RCB	Adequate	3	This alternative advances some goals and is not in conflict with any.
Alt 4C: Floodwall	Fair	2	This alternative may be in conflict with a few watershed goals

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Watershed Goals Checklist

Source	Goal	Status by Feasible Elements					
		Alt 4A	Alt 4B	Alt 4C	No Project		
City of Cupertino General Plan	*Policy 5-23: Conformance with Watershed-Based Planning and Zoning*	X	X	X	X		
City of Saratoga General Plan	*No goals specific to watersheds are specified*						
City of San Jose General Plan	*No goals specific to watersheds are specified*						
Santa Clara County General Plan	*Water quality and watershed management*						
	Reduce non-point source pollution.	X	X	X	X		
	Prepare and implement comprehensive watershed management plans.	X	X	X	X		
Watershed Management Initiative	Balance the objectives of water supply management, habitat protection, flood management and land use to protect and enhance water quality.	*	*	*	X		
SCVWD Lower Peninsula Watershed Stewardship Plan	*Incorporates District's Ends Policies (see following).*						
SCVWD Ends Policies	E-2.2.1—The cost of reducing the potential for flood damages is balanced with benefits (including possible environmental restoration and enhancement).	*	*	*	X		
	E-2.2.2—There is a balance between the contributions of watersheds and streams in providing for public health and safety and in providing protection of natural resource benefits.	X	*	X	X		
	E-3.1. Watersheds, streams, and the natural resources therein are protected and when appropriate enhanced or restored.	X	X	X	X		

Key to Status:

*** = would exceed goal
** = would meet goal
* = would partially meet goal
X = would not meet goal

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Objective 6—Protect the Quality and Availability of Water

Criterion 1: Water Availability – Impact on groundwater recharge

Rating guidance:

Outstanding: alternative would result in a net increase in recharge potential and improve functionality and performance of diversions

Adequate: no net change in recharge potential, diversions not negatively impacted

Poor: would reduce the potential for recharge, diversions not negatively impacted

Unacceptable: substantially reduces opportunity for recharge or degrade performance of diversions

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	No net change in potential recharge for the project area.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Adequate	3	No net change in potential recharge for the project area since the channel invert width is the same.

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Objective 6—Protect the Quality and Availability of Water

Criterion 2: Instream Water Quality – Water quality protection through vegetation and instream hydraulic complexity

Rating guidance:

Outstanding: alternative would improve water quality by creating a hydraulically complex channel and including native riparian vegetation in appropriate locations

Adequate: alternative would maintain current water quality conditions

Poor: alternative would reduce streamside vegetation and hydraulic complexity

Unacceptable: alternative would result in significant loss of vegetation, alternative would provide little or no hydraulic complexity

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	This element would not change the water quality.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Fair	2	Floodwall could 1) increase velocity, 2) increase scour of channel bed, 3) decrease local floodplain connection and inundation of riparian areas, and 4) induce scour and erosion downstream of UPRR if it raises the head upstream and increases pressure flow.

Objective 6—Protect the Quality and Availability of Water

Criterion 3: Offstream Water Management – Ability to enhance water supply and quality and reduce peak flows through local retention of rainfall

Rating guidance:

Outstanding: alternative contains elements that significantly increase retention and use of rainwater, significantly reduces peak flows, includes educational programs

Adequate: moderately increases retention and use of rainwater, moderately reduces peak flows to the creeks, includes educational programs

Poor: alternative does not contain any such elements

Unacceptable: alternative would discourage local capture of rainfall/runoff

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	Does not contain any such element.
Alt 4B: Double RCB	Poor	1	Same as Alt 4A
Alt 4C: Floodwall	Poor	1	Same as Alt 4A

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Objective 6—Protect the Quality and Availability of Water

Criterion 4: Flow Regime – Ability to maintain geomorphically and biologically appropriate range of flows

Rating guidance:

Outstanding: alternative maintains locally appropriate seasonal variation in flows that will support an appropriate physical channel configuration and habitat

Adequate: alternative includes modification to the locally appropriate flow regime with no significant impact on channel stability or habitat

Poor: alternative includes significant modifications to natural flow regime which is likely to have an impact on channel stability or habitat

Unacceptable: modifications to flow regime are likely to have a significant impact on channel stability or habitat

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	This element includes modifications to the locally appropriate flow regime (quantity and timing of flows) during flood events.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Adequate	3	Same as Alt 4A

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Objective 7—Cooperate with Other Local Agencies to Achieve Mutually Beneficial Goals

Criterion 1: Mutual Local Goals – ability to achieve project-specific goals and objectives developed jointly by the District and local agencies

Rating guidance:

Outstanding: all goals and objectives developed in a Memorandum of Consensus (MOC) are met

Adequate: some goals and objectives developed in the MOC of all agencies are met

Poor: MOC is developed but only District goals and objectives are met

Unacceptable: few objectives met, or no MOC developed

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	A Memorandum of Consensus has not been developed yet.
Alt 4B: Double RCB	Poor	1	Same as Alt 4A
Alt 4C: Floodwall	Poor	1	Same as Alt 4A

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Objective 7—Supports General Plan – Ability to support goals and policies as stated in general plans of partner agencies

Rating guidance:

Outstanding: supports all pertinent general plan elements

Adequate: supports some general plan elements

Poor: does not support some general plan elements, is in conflict with few

Unacceptable: significant conflicts with major elements in general plans

Criterion 2: Supports General Plan

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	Some of the goals and objectives developed for this element are consistent with the goals and objects expressed in the City of Saratoga's General Plan.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Fair	2	May obstruct an existing trail in the vicinity.

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General Plan Goals Checklist

Source	Goal	Status by Feasible Elements			
		Alt 4A	Alt 4B	Alt 4C	No Project
City of Cupertino General Plan					
	Natural Water Courses: Retain and restore creek beds, riparian corridors, watercourses and associated vegetation in their natural state to protect wildlife habitat and recreation potential and assist groundwater percolation (Policy 5-27).	X	X	X	X
	Recreation and Wildlife Trails (Policy 5-14)	X	X	X	X
City of San Jose General Plan					
	Develop parks and public open space lands.	X	X	X	X
	Protect the community from flood damage	**	**	**	X
Santa Clara County General Plan	Develop parks and public open space lands.	X	X	X	X
	Minimize the resident population within high hazard areas.	*	*	*	X
	Reduce the magnitude of the hazard, if feasible.	*	*	*	X
City of Saratoga General Plan					
	To provide and maintain open space resources of local and regional significance accessible to the public	*	*	X	X
	To provide and maintain parks and a variety of passive and active recreational sites which are located, designed, and improved to serve the needs of the residents, the community, and the neighborhoods of Saratoga	X	X	X	X

Key to Status:

*** = would exceed goal
** = would meet goal
* = would partially meet goal
X = would not meet goal
NA = goal not applicable (included to show context of other related goals)

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Objective 8—Community Benefits beyond Flood Protection

Criterion 1: Community Safety – Overall safety for appropriate access and recreation

Rating guidance:

Outstanding: all safety issues identified by public safety officials during their review is addressed

Adequate: most safety issues identified addressed, explanation provided for features deemed inappropriate or infeasible

Poor: few if any recommendations incorporated into alternative

Unacceptable: alternative was not reviewed by public safety officials

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Fair	2	A more complete review by public safety officials should be done before implementing this alternative
Alt 4B: Double RCB	Fair	2	Same as Alt 4A
Alt 4C: Floodwall	Poor	1	Safety concern associated with floodwalls. A more complete review by public safety officials should be done before implementing this alternative

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Objective 8—Community Benefits beyond Flood Protection

Criterion 2: Recreation – Quality of recreation experience provided by alternative

Rating guidance:

Outstanding: project would provide unique quality recreational opportunities or a variety of opportunities with good public access and amenities

Adequate: some recreational opportunities incorporated into alternative, access may be limited

Poor: few or no recreational facilities incorporated into alternative

Unacceptable: existing recreational facilities are removed

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	No recreational facilities are provided by this element
Alt 4B: Double RCB	Poor	1	Same as Alt 4A
Alt 4C: Floodwall	Poor	1	Same as Alt 4A

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Objective 8—Community Benefits beyond Flood Protection

Criterion 3: Aesthetics – Assesses quality of aesthetic form provided by alternative

Rating guidance:

Outstanding: This criterion is a qualitative assessment some features to consider include harmonizing with landscape, emulating the natural environment, unexpected large/small features, concrete textured or formed to mimic natural features, park-like setting, art use, amenities such as benches, is clever.

Unacceptable: hardscape significantly greater than greenscape, visual monotony, heavy use of plain concrete

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Fair	2	Removal of vegetation and trees and may be other features are likely due to construction of bypass under residential backyards.
Alt 4B: Double RCB	Adequate	3	A new double RCB has minimal aesthetic impact after construction.
Alt 4C: Floodwall	Poor	1	Significant visual impact will occur with the installation of approximately 7.5-feet high floodwall. Removal of tree(s) may be necessary and may obstruct an existing trail.

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Objective 8—Community Benefits beyond Flood Protection

Criterion 4: Social and Cultural Benefits – Opportunity to promote community involvement

Rating guidance:

Outstanding: includes appropriate infrastructure to support full range of social and cultural benefits

Adequate: includes appropriate infrastructure to support some social and cultural benefits

Poor: does not include appropriate infrastructure

Unacceptable: eliminates existing features or includes inappropriate features

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	The element design includes appropriate infrastructure to support some social and cultural benefits identified in an analysis of the site and the needs of the surrounding community.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Fair	2	Construction of this element may obstruct an existing trail

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Objective 8—Community Benefits beyond Flood Protection

Criterion 5: Local Economic Effects – Potential effect on property values and/or local business climate

Rating guidance:

Outstanding: probably increase in value of adjacent properties, commercial benefits to local businesses such as increased foot traffic, alternative increases development possibilities

Adequate: no measurable change to property values or local businesses

Poor: no change to property values, businesses negatively impacted

Unacceptable: decrease in property values and commercial access

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Fair	2	Economic benefits have not been thoroughly analyzed
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Poor	1	Economic benefits have not been thoroughly analyzed. Floodwall may cause a change in adjacent property value.

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Objective 8—Community Benefits beyond Flood Protection

Criterion 6: Open Space – Incorporation of open space into alternative design

Rating guidance:

Outstanding: ensures long-term protection of existing open space, creates new open space

Adequate: reserves existing open space in project area

Poor: existing open space would be degraded

Unacceptable: significant loss of existing open space

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Adequate	3	This element has no negative or positive impacts to existing open space within project area.
Alt 4B: Double RCB	Adequate	3	Same as Alt 4A
Alt 4C: Floodwall	Adequate	3	Floodwall adjacent to existing trail may degrade some open space.

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Objective 8—Community Benefits beyond Flood Protection

Criterion 7: Community Support – Alternative reflects community developed objectives and ideas

Rating guidance:

Outstanding: relative to other alternatives, community indicates preference for this alt

Adequate: community indicates acceptance of the alternative

Poor: community lacks support for the alternative

Unacceptable: community finds alternative unacceptable

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Fair	2	The District has not yet collaborated with the public in this decision making process.
Alt 4B: Double RCB	Fair	2	Same as Alt 4A
Alt 4C: Floodwall	Poor	1	Floodwalls are not usually welcome additions and community clearly indicates a lack of acceptance to this element.

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Objective 9—Minimize Life-Cycle Costs

Criterion 1: Net Present Value of Estimated Cost

Rating guidance:
Outstanding: Lowest capital cost
Very good:
Adequate:
Fair:
Poor:
Unacceptable: Highest capital cost

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	$4.4 million (SCVWD, 2007)
Alt 4B: Double RCB	Poor	1	$3.8 million (SCVWD, 2007)
Alt 4C: Floodwall	Very good	4	$0.8 million (SCVWD, 2007)

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Objective 9—Minimize Life-Cycle Costs

Criterion 2: Maintenance cost

Rating guidance:
Outstanding: Lowest maintenance cost
Very good:
Adequate:
Fair:
Poor:
Unacceptable: Highest maintenance cost

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	Not determined
Alt 4B: Double RCB	Poor	1	Not determined
Alt 4C: Floodwall	Very good	4	$500 (SCVWD, 2007)

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Objective 9—Minimize Life-Cycle Costs

Criterion 3: Grant or Cost-sharing opportunities

Rating guidance:
Outstanding: Greatest Opportunity
Very good:
Adequate:
Fair:
Poor:
Unacceptable: Smallest Opportunity

Alternative	Rating	# Score	Comments
Alt 4A: Underground RCP bypass	Poor	1	These opportunities have not been identified
Alt 4B: Double RCB	Poor	1	Same as Alt 4A
Alt 4C: Floodwall	Poor	1	Same as Alt 4A

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NFP Objective Ratings Calculation Table

SITE #4 (UPRR)

Alt 4A = Underground bypass
Alt 4B = Bridge Replacement
Alt 4C = Floodwall

		Factor	Alt 4A	Alt 4B	Alt 4C
Objective 1: Flood Protection					
1.1 Safety		**0.30**	3.00	3.00	3.00
1.2 Economic Protection		**0.30**	3.00	3.00	3.00
1.3 Durability		**0.10**	3.00	3.00	2.00
1.4 Resiliency		**0.10**	3.00	3.00	3.00
1.5 Local Drainage		**0.10**	3.00	3.00	3.00
1.6 Time to Implementation		**0.10**	3.00	3.00	4.00
	Objective Score:		**3.00**	**3.00**	**3.00**
Objective 2: Ecological Functions					
2.1 Local Habitat Goals		**0.25**	1.00	2.00	0.00
2.2 Habitat Provided		**0.25**	1.00	1.00	0.00
2.3 Sustainability of Habitat		**0.25**	1.00	3.00	1.00
2.4 Connectivity of Habitat		**0.25**	1.00	3.00	1.00
	Objective Score:		**1.00**	**2.25**	**0.50**
Objective 3: Physical Stream Functions					
3.1 Floodplain		**0.35**	0.00	0.00	0.00
3.2 Active Channel		**0.30**	0.00	2.00	1.00
3.3 Stable Side Slopes		**0.20**	1.00	1.00	0.00
3.4 Transitions		**0.15**	3.00	3.00	4.00
	Objective Score:		**0.65**	**1.25**	**0.90**
Objective 4: Maintenance					
4.1 Structural Features		**0.25**	3.00	3.00	1.00
4.2 Natural Processes		**0.25**	2.00	3.00	2.00
4.3 Urban Flows		**0.25**	2.00	2.00	2.00
4.4 Access		**0.25**	1.00	1.00	1.00
	Objective Score:		**2.00**	**2.25**	**1.50**
Objective 5: Integrate Within Watershed					
5.1 Meets Local Watershed Goals		**1.00**	1.00	3.00	2.00
	Objective Score:		**1.00**	**3.00**	**2.00**
Objective 6: Water Quality					
6.1 Water Availability (GW Recharge)		**0.30**	3.00	3.00	3.00
6.2 Instream WQ (Channel, Veg)		**0.40**	3.00	3.00	2.00
6.3 Offstream Water Mgmt (Runoff, Pollution)		**0.20**	1.00	1.00	1.00
6.4 Flow Regime		**0.10**	3.00	3.00	3.00
	Objective Score:		**2.60**	**2.60**	**2.20**
Objective 7: Local Agency Cooperation					
7.1 Mutual Local Goals		**0.50**	1.00	1.00	1.00
7.2 Supports General Plan		**0.50**	3.00	3.00	2.00
	Objective Score:		**2.00**	**2.00**	**1.50**
Objective 8: Community Benefits					
8.1 Community Safety (for Access and Rec)		**0.15**	2.00	2.00	1.00
8.2 Recreation		**0.20**	1.00	1.00	1.00
8.3 Aesthetics		**0.15**	2.00	3.00	1.00
8.4 Social and Cultural Benefits		**0.05**	3.00	3.00	2.00
8.5 Local Economic Effects		**0.15**	2.00	3.00	1.00
8.6 Open Space		**0.15**	3.00	3.00	3.00
8.7 Community Support		**0.15**	2.00	2.00	1.00
	Objective Score:		**2.00**	**2.30**	**1.35**
Objective 9: Cost					
9.1 Total Lifetime Cost		**1.00**	1.00	1.00	4.00
	Objective Score:		**1.00**	**1.00**	**4.00**

Ratings Key: 5.0 = Outstanding; 4.0 = Very good; 3.0 = Adequate; 2.0 = Fair; 1.0 = Poor; 0.0 = Unacceptable
Objective Score Key:
4.5 to 5 = Outstanding; 3.5 to 4.49 = Very good; 2.5 to 3.49 = Adequate; 1.5 to 2.49 = Fair; 0.5 to 1.49 = Poor; 0 to 0.49 = Unacceptable

Feasible Alternatives NFP Objective Ratings

SITE #4 (UPRR)

District Ends Policy 2.2.1 (Natural Flood Protection):	Objective Weight Rank:	Underground RCP* bypass Alt 4A	Bridge Replacement Alt 4B	Floodwall Alt 4C
1. Provide protection from flood damage	M	◒	◒	◒
2. Support ecological functions and processes	H	○	◔	○
3. Integrate physical stream functions and processes	H	○	○	○
4. Minimize maintenance requirements	H	◔	◔	◔
5. Integrate within the context of the watershed	L	○	◒	◔
6. Protect the quality and availability of water	M	◒	◒	◔
7. Cooperate with other local agencies to achieve mutual goals	M	◔	◔	◔
8. Maximize community benefits beyond flood protection	L	◔	◔	◔
9. Minimize life-cycle costs	M	○	○	◕

Ratings Key:

Outstanding:	●	Fair:	◔
Very Good:	◕	Poor:	○
Adequate:	◒	Unacceptable:	X

* RCP = Reinforced Concrete Pipe